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ABSTRACT

This report summarizes six studies that examined the work of the Swedish Free Writing in School (FRIS) project, which followed the language development of 191 elementary school students from different socioeconomic areas over a three-year period. Following a brief description of the project, the report discusses each of the six studies, which deal with pupils, essay themes, and language analysis; the development, description, and assessment of language; sex, home, and school differences in language; the language of creativity; child and adult language; and stimulation before free writing. Among the main findings of the studies reported are the following: (1) a significant linguistic development took place between grades four and six; (2) ratings could be predicted by a few simple facts from the essays, including number of different and unusual words and of punctuation marks used; (3) sex differences existed and tended to increase during the intermediate stage, with girls having higher productivity than boys; (4) differences existed between social groups in grade four, but almost disappeared in grade six; and (5) comparisons between adult and child language confirmed that vocabulary is important. (FL)

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SIX REPORTS ON FREE WRITING:

A summary of the FRIS project

special-topic
bulletin from
DEPARTMENT OF EDUCATIONAL AND PSYCHOLOGICAL RESEARCH
MALMO SCHOOL OF EDUCATION, LUND UNIVERSITY

Ebbe Lindell

DIDAKOMETRY

No. 61
October 1980

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Lindell, E. Six reports on free writing: A summary of the FRIS project. Didakometry (Malmö, Sweden: School of Education), No. 61, 1980.

The report describes the work of the FRIS project. FRIS is an abbreviation of the Swedish title, which in English is "Free writing at school". Within the project 191 pupils from different socio-economic areas are followed during the three years of the intermediate stage of Swedish comprehensive school.

The main results may be summarized in the following points:

- A significant linguistic development has taken place between grades 4 and 6. This is valid above all for productivity, while small or no differences are found for language usage.
- When expert ratings are taken as criteria, prediction from language facts rests above all on measures of productivity.
- Ratings can be predicted by a few simple facts from the essays. These are: the number of different words, of unusual words, of punctuation marks and word length.
- It is possible to describe the children's language by the aid of factor analysis.
- Sex differences exist and tend to increase during the intermediate stage. Girls have higher productivity than boys but no differences exist for usage.
- Differences between social groups exist in grade 4 but almost disappear in grade 6.
- Comparisons between adult and child language confirm the findings from age development and rating prediction: vocabulary is important.

Indexed: free writing, children's language, essay grading, linguistic analysis, social differences; intermediate stage of Swedish school.

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THE SIX REPORTS

The abbreviation FRIS is taken from Swedish "Fri skrivning i skolan", in English "Free writing at school". The first report from the project, chronologically, is a non-technical depiction of the main results and their consequences for education in the age domain of the project, namely the intermediate stage of Swedish comprehensive school. This report is written by a group of five project members (FRIS-gruppen, 1978). As it is itself a summary, it is not presented here.

Ann Martinsson is the author of an introductory report, describing some fundamental data. It presents the aims of FRIS, the time schedule, testing program and essay themes, pupil sampling and linguistic analyses (Martinsson, 1978a).

Martinsson, in her second report, describes the language of the pupils from the intermediate stage, the development between grades 4 and 6 and the relation between the language measures and essay judgements (1978b).

Lundquist reports language differences between boys and girls, between social groups and between schools in various socioeconomic areas, but also studies the interesting question of interaction between school and home (1978).

Petterson tries to find characteristics of the language of creativity (1978b). She describes the similarities and differences between the languages of adults and children (1978a). With the aid of enquiries and experiments she has caught some hints as to what stimulates the children to write (1978c).

Martinsson, A. Fri skrivning i skolan (FRIS): Elever, stoff och språkanalys. /Free writing at school (FRIS): Pupils, essay themes and language analysis./ Pedagogisk-psykologiska problem (Malmö: School of Education), Nr 348, 1978.

Pupils and data collections

As one of the aims of FRIS was to study possible differences in linguistic usage between social groups, three widely separated school districts in Malmö were chosen. In an earlier sociological mapping of Malmö, quotients were calculated on the basis of the parents' occupations. These social quotients (SQ in the table) could vary from 4, when all the parents had "higher" occupations, to 1, when all the parents had "lower". Our pupil group came from three schools with SQ:s and pupil numbers according to table 1.

Table 1. Pupils in the FRIS project

School	A SQ 2.95	B SQ 2.19	C SQ 1.42	Total
Boys	36	32	29	97
Girls	37	24	33	94
Total	73	56	62	191

This "group 191" participated in all data collections during the project time. Table 2 gives an overview of these collections and at the same time provides the work plan of the project.

Table 2. Data collections within the FRIS project

When?	What?	Why?
Grade 4, autumn 1970	"At the museum"	Free writing as basis for language description and language assessment and for studies of language development together with "At the camping ground" in grade 6.
Grade 4, spring 1971	Intelligence test	
	Language tests: Correctness Disposition Style test Adjective Style test Verb Word knowledge Adjective Dividing into sentences	Studies of prerequisites like word knowledge, knowledge of constructions and sense of style.
	Attitude tests: Writing activities I Writing activities II	Studies of children's attitudes to different kinds of written work.
Grade 5, autumn 1971	"The cat"	Free writing with various stimulation methods.
Grade 5, spring 1972	"The children's book"	Free writing with various stimulation methods, comparisons between the language of children and adults.
	Attitude test: Writing in school	Studies of children's attitudes to different essay themes.
Grade 6, autumn 1972	Creativity tests: Improvements Verbs Consequences Sentence completion Uses Abbreviations	Studies of general and verbal creativity.
Grade 6, spring 1973	"Near and far"	Free writing with various stimulation methods.
	"At the camping ground"	Free writing as basis for language description and language assessment, and for studies of language development together with "At the museum" in grade 4.

Essay themes

In the choice of essay themes we were faced with the problem of giving the pupils enough freedom to write what they wanted and at the same time giving enough stimulation to make everybody write at least something. From investigations in other areas we knew that children in grade 4, at the age of 10, were interested in animals and their evolution. We decided to present one rather large picture (but not a series of several pictures, as these often produce a few similar sentences from every child). The picture should contain some kind of animal and include an element of history.

The picture we chose was a drawing once used as the cover of a Swedish weekly magazine. It represented a school class on a visit to the animal department of a museum. It was very rich in information and provided connections with several school subjects. Above all, however, it represented a situation well known to most pupils.

14 suggestions for headings were given, some factual, others with more room for fantasy, but the pupils were informed that they could also use a heading of their own. Some of our pupils wrote totally new titles. Of the titles already given, 23 boys (but only 4 girls) chose "When I played Tarzan at the museum" and 23 girls (but only 7 boys) used "When I nearly frightened Lotta to death". All the essays have been given the general name "At the museum".

The period for writing was one ordinary lesson, about 40 minutes.

One aim of the FRIS project was to study the language development during the intermediate stage of the comprehensive school. Perhaps it would have been ideal for this purpose to use the same picture three years later, but we deemed this procedure impossible. Instead we looked for another picture of a similar kind for grade 6. We found a drawing by the same artist, this time describing episodes at a camping ground. Essays on this theme have been given the general title "At the camping ground". 92 of the "group 191" pupils wrote their own titles in grade 6.

The language analysis

Is it possible to relate quantitative differences in the use of grammatical categories and structures to non-linguistic variables? This is an important question in Martinsson's studies. As examples of "non-linguistic variables" we may take a few quotations from the Swedish curriculum and put them together with propositions about appropriate linguistic measures.

Quotations from the curriculum	Possible linguistic measures?
The aim ought to be to teach (the pupils) to express themselves in a simple and clear narration which is correct in language and spelling, easy to survey and written in a legible hand.	Is simple the same as short sentences and everyday wordings, i.e. frequent words? Is clear equal to precise word choice, i.e. varied word choice, infrequent words? Does correct in language and spelling mean absence of mistakes in these aspects? Is a separate analysis of errors necessary? Is sentence length an approximation of correct punctuation?
These exercises, which should be built on actualized needs in the classroom, intend to enrich, diversify and sharpen the mode of expression and to give fullness, vividness and comprehension to the narration.	A rich vocabulary ought to be a concrete expression for enrich, versify and sharpen. Different measures of sentence building should be possible, e.g. subordinate clauses, deep structure and the number of sentence parts. Is a description fuller if it contains adjectives or words which function as adjectives, e.g. participles? Does it become livelier by a great number of verbs? Does comprehension demand a number of relation words aiming forwards or backwards in the text? In that case, which are these words?

The language analyses were performed according to a system worked out by a group of linguists at the university of Lund. A separate worksheet was constructed for the benefit of the analysts (table 3). The example here is taken from Martinsson. For this report we have excluded a few identification data and some syntactical columns, which gives us the opportunity to insert a word-by-word translation into English of the Swedish text.

We read the example from left to right:

GM stands for graphic sentence. This unit is identified by the pupils' own punctuation.

MS is read macrosyntagm. This is the "logical" sentence according to common rules and is identified by the analyst independent of the pupils' punctuation. MS is nearly equivalent to Hunt's T-unit (1965).

ØNR gives the number of each word.

Table 3. Worksheet for the language analysis

FRIS

GM	MS	ØNR	US	DK	TEXT	Word-by-word translation	L1	L2	L3	L4	S1	S2	S3
004	004	001			ØØØ		§§				GM		
		002			Det	It	PØ	ØP			FS		
		003			var	was	AV	PT			FV		
		004			inte	not	AB	NA			NA		
		005			lätt	easy	AJ				SP		
		006			för	for	PR				ØA	PR	
		007			vaktmästaren	the guard	NN	DD	HH		ØA		
		008			1000		IF				ES		
		009	1000	1	att	to	IM				IM		
		010	|	1	hålla	keep	VV	N			N		
		011	|	1	reda	track	AB	ZA			PL		
		012	|	1	på	of	PR				ØA	PR	
		013	|	1	allt	everything	PØ	TP			ØA		
		014	|	1	och	and	++	ØC			ØA	++	
		015	1000	1	alla	everybody	PØ	TP	HH		ØA		
		016			.	.	IP				IP		

US means subordinate clause. The symbol 1000 stands for the first subordinate clause of first degree. For the second clause of first degree 2000 should have been used, for the first clause of second degree 1100 and so on.

DK marks deep structure. In this case the subordinate clause is regarded as one step deeper than the main clause.

TEXT includes what the pupils have written. Some "dummies" are inserted to give opportunity to mark the lexical and syntactic functions of the clauses. Here the clause 1000 is an infinitive phrase and stands as proper subject (the symbols IF in column L1 and ES in column S1).

L1-L4 contain the lexical analysis and

S1-S3 the syntactic one. The original worksheet had six S-columns.

We then follow the lexical and syntactic analyses by reading the text line by line; see next table.

Table 4. Explanations of the worksheet

Text	L-columns	S-columns
0000	Declarative macrosyntagm	Graphic sentence
It	Pronoun, personal	Formal subject
was	The verb "be", preterite	Finite predicate verb
not	Adverb, negative	Negating adverbial
easy	Adjective	Complement of the predicate
for	Preposition	Object adverbial
the guard	Common noun, definite form, human	Object adverbial
1000	Infinitive phrase	Proper subject
to	Infinitive mark	Infinitive mark
keep	Common verb, infinite verb	Infinite verb
track	Adverb, remaining type	Verb particle
of	Preposition	Object adverbial, preposition
everything	Pronoun, total	Object adverbial
and	Coordinating conjunction, the word "och"	Object adverbial, the word "och"
everybody	Pronoun, total, human	Object adverbial
.	Stop	Stop

It is, perhaps, worth mentioning that this language analysis is complete. Every part gets its own marking, which separates it from all other parts. In most other cases we have studied, the researchers have concentrated on a number, perhaps a great number, of language phenomena, but seldom or never has the total output been registered. The analysis system gives an almost infinite number of facts within the total essay material. An example in the Martinsson report shows that a short essay of 41 words gives 374 language measures of potential interest.

It is quite obvious that we needed some restrictions in our choice of language measures for further calculations. This process contained four steps:

Selection 1, 200 language measures. A great many of our language facts had low frequencies. Studies of a part of the material made it possible to exclude these. One criterion for inclusion was that at least half of the pupil group should have one example of the fact in question.

Selection 2, 87 language measures. Some descriptive calculations were made on the 200 measures, giving among other things the correlations with essay judgements. The new selection used these correlations as one of the criteria. Extreme skewing was a reason for exclusion.

Selection 3, 20 factor measures. A factor analysis was performed with the 87 measures. This gave 10 factors. As 87 might be viewed as too many variables in relation to the number of pupils, a new analysis was made with 2 measures from each of ten factors.

Selection 4, 16 computer measures. As our language analysis requires much time and work by experts, we decided to make calculations on such language facts as could be identified by a computer. The definition "identified by a computer" is somewhat flexible according to how much information you choose to give the machine.

The content of these selections will be presented in Martinsson's second report in connection with the results.

It might be of some interest to note that the linguistic analysis is not wholly reliable in the sense of agreement between coders. Martinsson made a special study covering 20 lexical and 15 syntactic measures. For these 35 variables we present the agreements between two experts, in percent, in table 5.

Table 5. Coder agreement

Percent agreement	Number of language measures
90 or more	22
89-80	6
79-70	6
less than 70	1

The most troublesome measure was that of "verb particle" with 64%. In this case certain disagreement seems inevitable as long as we work with written language, because the analysis is determined by accentuation in speech. If you say "drive through" with stress on "through", this word is coded as a verb particle. If, on the other hand, you stress "drive", "through" will be classified as a preposition. And accentuation can only be guessed from written language. In most other cases we have quite acceptable coder agreement.

Martinsson, A. Språket i fri skrivning: Beskrivning, utveckling och bedömning. En studie inom projektet FRIS (Fri skrivning i skolan). /The language of free writing: Description, development and assessment. A study within the project FRIS (Free writing at school)./ Pedagogisk-psykologiska problem (Malmö: School of Education), Nr 349, 1978.

Description and development

The description and the study of development go hand in hand. The basis for most conclusions and discussions is the following table, giving values for selection 2, the 87 language measures. F, p and ω^2 refer to variance analyses for the difference between grades. For many measures quotients have been calculated with the number of words, measure 18, as denominator. For other measures quotients give erroneous information. Among these are variables including different words, because the proportion between different and running words changes as the text grows longer.

The registration of different words, totally and for different word classes, was built on discussions of the following kind: if a pupil uses four adjectives in his essay, it is better if these are four different adjectives than if they are only repetitions of the same word. We now know, however, from the results, that the correlations with judgements are almost identical for the two ways of registering.

In the table you find the abbreviation p.s., which stands for "primary sentence part". If, for instance, a subject consists of the words "the angry guard", the coders mark "subject" for everyone of the three words. This gives the number of three for the measure 58 (and 60). The computer also registered such a series as only one "subject p.s.", measure 59 (and 61). The argument for this procedure was of a similar kind as for different words: a more detailed sentence part is more informative than only one word.

Two word frequency lists are labeled "Allén" and "H-G". Allén (1972) has published a list based on the language of five Swedish daily papers. Hassler-Göransson's word list is older (1956). It is built on various sources, among them literature, letters and children's essays. The notation H-G 1-200, for instance, implies the two hundred most common words according to Hassler-Göransson.

Table 6. Language measures in raw scores and quotients for grades 4 and 6. Comparisons between the grades

Variable	Raw scores: Grade 4 m	s	min/max	Grade 6 m	s	min/max	F	p	ω^2	Quotients: Gr 4 m	Gr 6 m	F	p	ω^2
1. Graph sentence	12.20	6.21	1/37	19.27	8.97	3/63	136.76	0.00	0.17					
2. Macrosyntagm	16.85	8.91	1/64	26.89	12.04	4/75	118.17	0.00	0.18					
3. Words/GS, m	12.41	9.25	5.0/91.0	12.30	4.59	6.6/53.2	0.02	0.89	0.00					
4. Words/GS, s	5.90	4.21	0/36.06	6.86	4.59	2.68/48.55	5.32	0.02	0.01					
5. Words/ME, m	8.11	1.92	4.4/17.6	8.52	1.75	3.5/15.9	4.61	0.03	0.01					
6. Words/ME, s	3.82	1.39	0/9.18	4.79	1.35	2.45/8.79	54.15	0.00	0.11					
7. Sub. cl. 1000	7.25	4.10	1/24	11.86	5.15	2/28	128.35	0.00	0.20					
8. Sub. cl. tot.	10.03	6.24	1/37	17.64	8.26	2/47	141.23	0.00	0.21					
9. Words/sub. cl. 1000, m	4.59	0.89	2.75/9.00	4.63	0.72	2.75/7.00	0.20	0.66	0.00					
10. Words/sub. cl. 1000, s	1.68	0.67	0/3.61	1.95	0.63	0/4.18	17.57	0.00	0.04					
11. Deep coeff.	4.47	1.40	0/19	8.08	4.54	0/24	103.64	0.00	0.17					
12. Clauses	27.86	14.33	2/97	45.07	19.18	8/115	153.32	0.00	0.21					
13. Affirm Sent	15.93	7.81	1/49	24.39	10.54	4/65	118.13	0.00	0.17					
14. Rel. clauses	3.37	2.57	0/14	5.59	3.14	0/17	54.83	0.00	0.13					
15. Coord. phrases	2.81	2.50	0/12	4.28	3.13	0/15	29.64	0.00	0.06					
16. Clause depth	11.35	8.93	0/43	21.32	11.79	0/68	97.52	0.00	0.18					
17. Lines	176.53	87.82	16/506	301.07	123.31	41/733	201.42	0.00	0.25					
18. Words	130.81	65.19	14/354	221.20	89.18	31/526	197.55	0.00	0.25					
19. Diff. words	80.15	32.88	11/222	127.27	42.08	25/266	255.21	0.00	0.28					
20. Words used once	58.40	23.74	8/167	92.75	30.44	21/189	263.11	0.00	0.28					
21. Word length, m	4.05	0.26	3.33/4.81	4.20	0.26	3.57/4.86	42.67	0.00	0.07					
22. Word length, s	1.95	0.27	1.38/2.94	2.19	0.31	1.48/3.10	90.27	0.00	0.15					
23. Words Allén 1-200	72.87	37.18	7/219	125.11	51.36	18/296	198.55	0.00	0.25	55.65	56.54	2.53	0.11	0.00
24. Words H-G 1-200	78.25	39.27	7/224	134.83	55.25	21/311	202.79	0.00	0.26	59.80	60.93	3.57	0.06	0.01
25. Words Allén 201-601	10.44	6.72	0/47	21.10	10.20	3/60	184.83	0.00	0.27	7.88	9.57	28.88	0.00	0.07
26. Words H-G 201-600	9.72	6.76	0/37	19.65	10.43	0/59	164.71	0.00	0.24	7.19	8.71	25.21	0.00	0.06
27. Words not Allén	44.77	23.89	6/174	69.41	29.88	10/191	125.73	0.00	0.17	34.53	31.54	32.04	0.00	0.06
28. Words not H-G	39.53	22.13	5/161	59.10	25.98	10/169	97.77	0.00	0.14	30.50	26.95	38.59	0.00	0.07
29. Common nouns	21.33	11.51	2/63	34.38	15.11	1/96	137.43	0.00	0.19	16.68	15.68	5.89	0.02	0.01
30. Diff. common nouns	18.15	9.28	2/53	28.95	12.38	1/77	143.28	0.00	0.20	14.44	13.36	8.18	0.00	0.02
31. Nouns	27.05	14.49	2/79	39.38	17.57	3/98	81.35	0.00	0.13	21.13	17.91	39.28	0.00	0.08
32. Diff. nouns	22.23	11.94	2/68	32.09	13.92	3/79	80.33	0.00	0.13	17.63	14.78	35.72	0.00	0.07
33. Pronouns	22.59	12.54	2/66	42.18	18.91	7/119	183.65	0.00	0.27	17.37	18.99	14.29	0.00	0.03
34. Diff. pronouns	10.24	4.41	2/24	16.13	5.58	4/36	176.41	0.00	0.25	8.36	7.65	9.87	0.00	0.02
35. Numerals	7.35	5.87	0/34	11.18	5.83	0/29	52.05	0.00	0.10	5.55	5.21	1.64	0.20	0.00
36. Adjectives	3.92	3.12	0/18	9.00	5.47	0/29	175.55	0.00	0.24	2.92	3.99	37.36	0.00	0.07
37. Diff. adj.	3.65	3.00	0/15	8.08	4.76	0/26	186.44	0.00	0.24	2.68	3.62	40.06	0.00	0.08
38. "Be"	3.57	2.60	0/12	5.76	3.58	0/20	57.30	0.00	0.11	2.87	2.58	2.91	0.09	0.00
39. Head verbs	19.62	10.50	1/61	30.61	13.17	8/72	119.60	0.00	0.17	14.93	13.95	11.58	0.00	0.03
40. Diff. head verbs	15.79	7.66	1/48	24.32	10.05	7/57	152.14	0.00	0.21	12.30	11.50	10.61	0.00	0.02
41. Verbs	29.11	15.38	2/97	47.58	19.87	9/113	151.71	0.00	0.21	22.22	21.50	6.52	0.01	0.01
42. Diff. verbs	20.53	9.22	2/61	33.02	12.28	8/73	195.61	0.00	0.25	16.27	15.30	12.92	0.00	0.03
43. Adverbs	16.47	9.21	0/43	30.36	14.32	4/86	178.47	0.00	0.25	12.48	13.75	11.95	0.00	0.03
44. Diff. adverbs	11.43	5.41	0/14	20.70	7.90	4/48	285.13	0.00	0.32	9.02	9.72	7.66	0.01	0.02
45. Prepositions	10.89	5.79	2/31	17.38	8.05	1/47	130.56	0.00	0.18	8.53	7.89	7.59	0.01	0.02
46. Diff. prep.	5.25	2.18	1/13	7.93	2.67	1/15	151.65	0.00	0.23	4.49	3.88	13.18	0.00	0.03
47. Coord. conj.	7.66	5.25	0/26	12.49	6.87	1/43	72.53	0.00	0.13	5.78	5.58	0.68	0.41	0.00
48. Diff. coord. conj.	2.18	1.03	0/6	2.88	1.10	1/7	52.62	0.00	0.10	1.81	1.43	27.62	0.00	0.05
49. Definite articles	9.10	6.12	0/41	12.33	6.80	1/44	30.03	0.00	0.06	6.95	5.60	23.61	0.00	0.06
50. Def. pronouns	6.25	5.21	0/27	9.27	6.66	0/39	29.27	0.00	0.06	4.61	4.06	3.87	0.05	0.01
51. Pers. pron.	7.37	6.14	0/28	15.39	10.11	0/53	89.13	0.00	0.19	6.02	7.07	6.89	0.01	0.01
52. Verbs in preteritum	21.03	11.43	0/63	31.68	14.57	0/87	85.87	0.00	0.14	16.16	14.40	17.13	0.00	0.04
53. Def. adverbs	3.60	2.86	0/16	6.32	3.52	0/20	73.69	0.00	0.15	2.91	2.96	0.05	0.82	0.00
54. Rel. adverbs	1.76	1.60	0/9	2.48	2.06	0/9	13.38	0.00	0.03	1.45	1.13	7.23	0.01	0.02
55. Remaining adverbs	8.19	5.80	0/31	14.60	7.78	1/49	126.57	0.00	0.18	5.89	6.56	8.65	0.00	0.02
56. The word "och" /and/	6.06	4.58	0/32	9.07	5.31	0/29	40.53	0.00	0.08	4.68	4.09	5.30	0.02	0.01
57. Words for persons	25.24	13.03	1/76	36.20	16.16	6/86	71.80	0.00	0.12	19.55	16.37	72.61	0.00	0.13
58. Common subjects	25.91	13.44	2/80	41.11	17.35	5/93	137.60	0.00	0.20	19.81	18.64	13.56	0.00	0.03
59. Common subj. p.s.	21.74	10.65	2/60	33.38	13.93	5/82	121.93	0.00	0.18	16.79	15.09	58.97	0.00	0.11
60. Subjects	27.81	14.39	2/85	43.78	18.51	5/101	127.28	0.00	0.19	21.38	19.75	22.17	0.00	0.04
61. Subjects p.s.	22.92	11.17	2/64	35.03	14.66	5/88	118.70	0.00	0.18	17.73	15.83	70.03	0.00	0.13
62. Finite predicate verbs	21.99	11.93	2/70	37.28	15.36	8/90	128.00	0.00	0.19	18.48	16.94	45.63	0.00	0.09
63. Fin. pred. verbs p.s.	23.85	11.90	2/70	36.96	15.22	8/89	125.87	0.00	0.19	18.36	16.80	43.85	0.00	0.09
64. Infinite verbs	5.11	4.50	0/17	9.98	5.79	0/26	108.31	0.00	0.18	3.72	4.43	11.79	0.00	0.03
65. Inf. verbs p.s.	5.10	4.50	0/17	9.96	5.78	0/26	107.83	0.00	0.18	3.71	4.42	11.53	0.00	0.03
66. Predicate verbs	29.10	15.32	2/86	47.26	19.76	9/113	146.74	0.00	0.21	22.19	21.37	8.77	0.00	0.02
67. Pred. verbs p.s.	28.96	15.28	2/95	46.92	19.62	9/113	144.81	0.00	0.21	22.08	21.22	9.53	0.00	0.02
68. Complements of the pred.	5.76	6.00	0/30	12.63	8.46	0/44	99.98	0.00	0.18	4.25	5.60	15.58	0.00	0.04
69. Compl. of the pred. p.s.	4.49	5.16	0/17	7.36	4.67	0/25	107.33	0.00	0.19	2.61	3.27	14.21	0.00	0.03
70. Direct objects	16.34	10.68	1/71	28.17	14.87	0/94	97.82	0.00	0.17	12.29	12.63	0.74	0.39	0.00
71. Direct objects p.s.	11.62	7.70	1/60	18.27	9.83	0/69	66.88	0.00	0.12	8.83	8.23	4.29	0.04	0.01
72. Objects	16.61	10.89	1/77	28.69	15.17	0/96	98.64	0.00	0.17	12.46	12.86	0.99	0.32	0.00
73. Objects p.s.	11.87	7.94	1/64	18.75	10.13	0/71	62.73	0.00	0.12	9.00	8.44	3.70	0.06	0.01
74. Adverbials of place	18.45	10.56	0/53	24.35	12.25	0/59	33.63	0.00	0.06	14.63	11.14	46.08	0.00	0.09
75. Adv. of place p.s.	7.42	4.01	0/24	9.80	4.72	0/23	37.27	0.00	0.07	5.92	4.48	57.57	0.00	0.12
76. Adverbials of time	9.49	5.82	0/30	18.51	9.63	0/51	132.87	0.00	0.24	7.68	8.47	3.85	0.05	0.01
77. Adv. of time p.s.	5.93	3.62	0/17	10.51	5.11	0/30	107.14	0.00	0.21	4.78	4.84	0.06	0.81	0.00
78. Adverbials in column S1	41.67	19.79	5/106	73.68	31.35	4/187	221.07	0.00	0.27	32.49	33.36	2.11	0.15	0.00
79. Adverbials p.s.	21.60	10.52	1/56	38.31	16.36	1/97	217.14	0.00	0.27	16.70	17.30	4.23	0.04	0.01
80. Verb particle	5.47	3.93	0/19	8.53	4.70	1/25	64.52	0.00	0.11	4.03	3.95	0.18	0.68	0.00
81. Determining attributes in S2	11.24	7.81	1/40	20.14	9.66	0/60	125.68	0.00	0.20	8.45	9.16	4.92	0.03	0.01
82. Attributes in S2	16.65	11.87	1/66	31.71	15.28	0/94	176.24	0.00	0.23	12.56	14.36	14.56	0.00	0.03
83. Prepositions in S2	9.88	5.19	1/28	14.88	7.19	1/41	90.78	0.00	0.14	7.73	6.72	23.99	0.00	0.05
84. Punct marks separ sentences	11.59	5.46	0/35	18.41	8.98	2/66	130.05	0.00	0.17	9.11	8.34	9.27	0.00	0.02
85. Punct marks	13.91	7.69	0/47	26.29	14.41	2/94	176.36	0.00	0.22	10.81	11.77	8.30	0.00	0.02
86. Remaining [illegible]	5.57	4.75	0/20	10.88	4.99	0/25	168.53	0.00	0.24	4.60	5.02	4.30	0.04	0.01
87. Remaining [illegible]	3.27	1.83	0/9	5.17	2.01	0/11	110.29	0.00	0.19	2.66	2.47	2.64	0.11	0.00

The quite overwhelming impression of table 6 is that the pupils have more of everything in grade 6. This is of course simply explained by the fact that the essays are longer in the higher grade. The ω^2 is high, the mean is .17. Note especially the values for words, different words and words used once, which are .25, .28 and .28. The mean length of the essays in grade 4 is 131 words, in grade 6 the mean is 221.

The fact that the number of words increases is in itself a trivial observation if we do not at the same time ponder upon the meaning of word number. Martinsson cites Page & Paulus (1968, p. 15):

"... we have been forced to coin two words: trin and prox. A trin is the intrinsic variable of real interest to us. For example, we may be interested in a student's 'aptness of word choice', or 'diction'. A prox, on the other hand, is some variable which it is hoped will approximate the variable of true interest. For example, the student with better diction will probably be the student who uses a less common vocabulary. At present, the computer cannot measure directly the semantic aptness of expression in context, or 'diction'. But it can discover the proportion of words not on a common word list, and this proportion may be a prox for the trin of diction."

The prox "number of words" is motivated in this way (p. 26):

"Length of essay in words is surely a characteristic associated with advancing maturity and skill; and it is a commonplace correlative of high ratings from human judges."

It might be added that "number of different" words with its high ω^2 between the grades could be seen as a prox to the trin vocabulary.

The Swedish linguist Hultman writes (Hultman & Westman, 1977, p. 55):

"... the number of words in an essay can namely be interpreted as a natural and good measure of a pupil's language productivity. ... But productivity might not be seen only as the simple ability to pile words on each other in as great stacks as possible. It is more a symtom of a mastery of language expressing itself in the use of language to solve the given task."

Word length is independent of essay length. The results show that the children's words are growing longer during the three years. Three explanations may be offered. The children choose their words more carefully, and precision leads to longer words. Older children spell better. As many spelling errors are omissions (in Swedish especially one of the letters in the spelling with double consonants), better spelling gives longer words. A third explanation refers to the Swedish use of compound words. "Polar bear" is one word in Swedish, so also is "museum guard". The younger children are not quite sure of this habit, the older tend to use more compound words. This increases word length, too.

Our two types of sentences, the graphic (GS) and the logical (MS), show interesting changes. The GS is somewhat shorter in grade 6, but

the difference is not significant. The MS is longer, and the result is significant although ω^2 is only 1%. That sentences of the types MS and T-unit grow longer with better writing is nowadays well known. We think, however, that the lengthening is not as pronounced in our studies as it usually is within studies in the English language. Martinsson cites studies from, for example, Hunt (1964) and Golub & Fredrick (1970), where the differences are 1.4 and 2.3 whole words between grades 4 and 6. The lengths in our case are 8.11 and 8.54. Here is a clear dissimilarity between the languages. For us it is a more important discovery that the standard deviation of MS-length significantly increases with ω^2 .11. This indicates that variation in sentence length is better than length in itself.

In the construction of GSs two forces collide. One is the children's power of writing longer MSs, which increases GS-length. The other is the children's better punctuation, which decreases GS. The result of the clash is that GSs do not change from grade 4 to grade 6.

When discussing the word classes, let us first state that calculations with different words give almost the same results as those with running words. The hypothesis that different words would be a more interesting measure was thus not verified. Nor do we find any differences in calculations between "primary sentence parts" and sentence parts marked for every word.

In absolute numbers every word class increases from grade 4 to grade 6. This is a simple consequence of essay length. But these increases may conceal changes in usage. Martinsson has made detailed studies of four word classes, namely adverbs, adjectives, pronouns and nouns. As an example here we choose the adjectives. The following table is a direct translation from Martinsson. The criterion for including a structure in the table was a frequency of at least 1%.

It is clear from the table that adjectives are mostly used as nominative complements to the predicate or as attributes. The former is most common in grade 4, the latter in grade 6. The attribute indicates a more condensed language. Children use adjectives in more ways in grade 6. The percentages do not add up to 100. The rest are scattered over less frequent constructions.

Table 7. The use of adjectives

Grade 4	Grade 6
Number of adjectives: 748 (2.92% of the number of words)	Number of adjectives: 1719 (3.99% of the number of words)
Of these about	Of these about
40% are nominative complement to the predicate. The most common ones are afraid, angry and fun.	30% are nominative complement to the predicate. The most common ones are angry, glad and fun.
36% adjective attribute. The most common ones are big and small with flections.	40% adjective attribute. The most common ones are small and big with flections.
The adjective attributes are divided into: 9% qualifier to direct object 6% qualifier to nominative complement to the predicate 6% qualifier to common subject 4% qualifier to adverbial of place 3% qualifier to object adverbial 2% qualifier to proper subject 1% qualifier to remaining adverbial 1% qualifier to non-classified sentence part	The adjective attributes are divided into: 11% qualifier to direct object 8% qualifier to nominative complement to the predicate 7% qualifier to common subject 3% qualifier to remaining adverbial 3% qualifier to object adverbial 1% qualifier to adverbial of time 1% qualifier to non-classified sentence part
9% remaining adverbial, e.g. sudden, fast and high.	11% remaining adverbial. The most common ones are straight, fast and right. Example: Then he drove right through a tent.
6% direct object. Here we find fun with synonyms. Example: Then everybody wanted to do something fun.	2% direct object. White is a new example: ... some played indians and whites ...
2% remaining adverbial in a nominative complement to the predicate.	2% remaining adverbial in a nominative complement to the predicate. Example: ... that she was so very proud of.
	3% adverbial of time. The most common one is suddenly.
	1% objective complement to the predicate. Example: A man who went with his arms full of firewood ...

For the sentence parts, both syntactic and lexical analyses are possible. Martinsson has studied four parts in detail. These are subject, object, adverbial of place and adverbial of time. As an example for this report we choose the subject.

Table 8. The syntactic structure of the subjects

Grade 4	Grade 6
The number of common subject as primary sentence part: 4183	The number of common subject as primary sentence part: 6460
The number of different constructions: 56	The number of different constructions: 106
Of these about	Of these about
87% are one word subject. The most common words are in falling frequency: I, we, he, it and who.	87% are one word subject. The most common words are in falling frequency: I, we, it, he and who.
7% determining attribute + head noun. The most common one is a boy. Then follow (the) whole class, our class and two boys.	7% determining attribute + head noun. Here we find a grasscutter, a dog and a boy.

The remaining constructions, that is most of them, fall under 1%. The absolutely most common subject in these ages thus consists of only one word. We find no differences between the grades with one exception. This, however, we regard as one of our most important findings: the syntactic "repertory" is almost doubled within the three years, from 56 to 106. We may complete this with the values for the three other sentence parts. The object constructions increase from 67 to 108, the constructions of the adverbial of place from 94 to 148 and of adverbial of time from 53 to 115.

The table above implies some results in the next one, which gives the word classes within the subjects.

Table 9. The lexical analysis of the subjects

Grade 4	Grade 6
29% 1st and 2nd personal pronoun, mostly I and we.	38% 1st and 2nd personal pronoun, mostly I and we.
17% definite pronouns. He has the highest occurrence, then come they and she.	15% definite pronouns. He has the highest occurrence, then follow it, they and she.
15% proper names.	5% proper names.
9% common nouns. Teacher and guard are most common.	9% common nouns. The most frequent ones are daddy, grasscutter and mommy.
7% impersonal it.	10% impersonal it.
6% relative pronoun who.	6% relative pronoun who.
3% indefinite article + common noun, the most frequent one a boy.	3% indefinite article + common noun. Among them we find a boy, a dog and a grasscutter.
2% remaining pronouns, generally one and several.	2% remaining pronouns, generally one.
1% total pronouns, generally everybody.	

The greatest differences exist for 1st and 2nd personal pronouns and for proper names. The former increase, the latter decrease. The style, thus, is more personal in grade 6 but the persons are less often called by their names.

The objects, too, consist mostly of only one word. This is the case in 68% in grade 4 and in 59% in grade 6. In both grades the construction attribute + noun takes the second place. In contrast to the subjects, the objects are mostly nouns; then follow objects with indefinite article + noun.

Adverbials of place have as their dominant construction preposition (+ article) + noun. These decrease in grade 6, where adverbs, e.g. here and there, occur as substitutes. Adverbials of time, on the other hand, mostly consist of only one word. These score 70% and 65%, respectively. Among these words we find when, then and now.

At last some words may be said about the proportional distribution of the word classes. Martinsson has given a table including results from both FRIS and two other Swedish projects working with more advanced language.

Table 10. Word classes in percent at different ages

Word class	Grade 4	Grade 6	3rd year of the gymnasium	Professional information text
Verbs	22.22	21.50	18.85	16.15
Nouns	21.13	17.91	21.87	27.05
Pronouns	17.37	18.99	16.35	12.56
Adverbs	12.48	13.75	9.69	8.56
Prepositions	8.53	7.89	9.36	12.00
Conjunctions	7.33	7.27	8.12	6.34
Numerals	5.55	5.21	3.60	4.47
Adjectives	2.92	3.99	6.65	7.29

From grade 4 to 6 nouns and pronouns have changed places. We think, however, that the richness of nouns in grade 4 is not of the same kind as in professional texts. As was shown in a preceding table, a great many of the nouns in grade 4 were proper names. Another explanation of the deviation of grade 4 from the general language development in this case may be that pure enumeration plays a certain role in the younger pupils' essays.

Language factors

One reason for factor analysis is evident. It gives a more comprehensive view of the abundant amount of information from the language measures.

Since 87 facts are difficult to grasp, a few factors would be easier. We did, of course, hesitate before the task of factor analysing our 87 variables. First, the number of variables is great compared to the number of pupils. Second, the intercorrelations are sometimes very high. In fact, the computer program excluded two variables as being identical. From this follows that the communalities are very high, in some instances even 1.00. This practically never occurs in general test analyses. But the result is not astonishing in this case. If the factors reproduce the grammatical structures of language they will detect very much linguistic variance.

Another reason for factor analysis is the problem of length or productivity. We have already stressed the importance of essay length, but of course length carries with it a great many other variables. The problem of length can be solved in various ways. For some measures calculations could be based on proportions. In earlier research, formulas for correction of the influence of length have appeared. On the advice of our psychometric consultant, docent Bernt Larsson, we chose to try to "catch" length by factor analysis. It could be anticipated that length would appear as an important factor, extracting a great deal of the variance. Remaining factors would be independent of length.

In our opinion the analyses gave meaningful factors, easy to interpret. Analyses were done in both grades. These independent analyses showed many important similarities but also some interesting differences. The following overview gives ten factors for each grade.

Table 11. Language factors

Factors in grade 4		Factors in grade 6	
I	Productivity	I	Productivity, narrative language
		II	Productivity, descriptive language
II	Adjectives - complements to the predicate	III	Adjectives - complements to the predicate
III	Adverbial	IV	Adverbial
IV	Verb		
V	Attribute	X	Attribute
VI	Coordination		
VII	Relative clauses	V	Relative clauses
VIII	Length of syntactic sentences and subordinate clauses	VI	Syntactic length and coordination
		IX	Subordinate clause length
IX	Word length	VII	Word length
X	Graphic sentence length	VIII	Graphic sentence length

The stability of the results is of course strengthened by the similarity of the structures from the two grades. For grade 4 the criterion of "eigen values" greater than 1 gave 10 factors. For grade 6 the same restriction gave eleven factors, but as one of these contained only one variable, we repeated the analysis with ten factors and got what we now have in the right column. The stability is the more remarkable as some reservations were expressed above concerning the possibility of factor analysis.

Of the 87 measures underlying these factors, most were obtained by very tedious and time-consuming language analyses. When we discussed various methods of making factor analyses with fewer variables, we chose, as one possibility, to include only such language facts as could be registered by the computer without a previous linguistic treatment. The number of such facts is ruled by the amount of information we give to the computer. From our 87 measures we could directly use 16. They appear from the factors of this analysis.

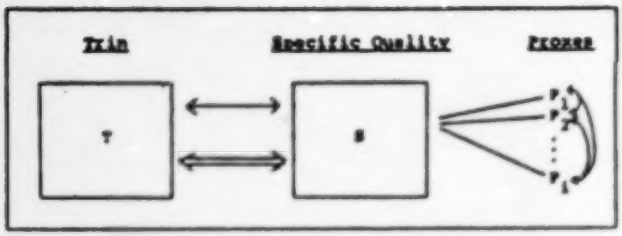
Factor I, productivity: words, different words, words Allén 1-200, words H-G 1-200, words used once, words not Allén, words not H-G, words H-G 201-600, GS, words Allén 201-601, punctuation marks separating sentences, punctuation marks.

Factor II, graphic sentence length: words/GS m, words/GS s, punctuation marks separating sentences, GS (the signs for the two last loadings are reversed).

Factor III, word length: word length m, word length s.

These results are from grade 6; those from grade 4 are quite similar. The three factors found recall three factors from the 87 variables with the same names: productivity, graphic sentence length and word length. The variables which are identical for both analyses fall in the same factors in both cases. So we may say that the analysis with fewer variables partly verifies that with a greater number.

By reproducing a figure from Slotnick (1972, p. 254), Martinsson gives an interesting interpretation of the meaning of factors in language description and language assessment. We include the figure here with accompanying explanation.



General model of computer essay grading. The trin (T) is a quality actively sought by trained graders; the specific quality (S) is a cluster of highly intercorrelated proxes (P_1 through P_i). The two-headed arrows indicate high statistical relationships. The double arrow indicates a logical relationship. (Slotnick, 1972, p. 254)

Clear similarities with the FRIS results are found. When the proxes - our variables or language measures - are the same, they have fallen into factors of the same kind. We take the liberty of reproducing another part of Slotnick's work (p. 362), this time a table with trins, specific qualities (FRIS: factors) and proxes (FRIS: variables).

Number	Trin	Specific Quality	Characteristic Proxes (Aspects)
1	Quantity of ideas, including generalisations, tight argumentation, etc.	Fluency: the total amount of wordage the student puts on the paper.	Number of total words, number of different words: frequencies of commas, sentences, and function words.
2	Spelling	Misspelling: frequencies of various kinds of misspellings.	Number of total misspellings and number of different misspellings of (1) common words, (2) uncommon words, and (3) difficult words.
3	Diction, including range of vocabulary and word choice.	Diction, especially as it is reflected by characteristics of word size.	Mean and standard deviation of word length. Also included are the absence of misspellings of uncommon words and the presence of head position gerunds and past participles.
4	Sentence structure, especially as it relates to variability in structure.	Sentence structure as reflected in sentence length.	Number of sentences, mean sentence length, and standard deviation of sentence length.
5	Punctuation, primarily as it reflects complexity of thought and emphasis.	Punctuation marks which are not commonly used.	Frequency of colons, semicolons, quotes, and parentheses.
6	Paragraphing as it pertains to the appearance of one major thought per paragraph.	Paragraph developments, especially as it is reflected by number and average length of paragraphs.	Number of paragraphs and mean paragraph length.

Relations to assessments

After studying various methods of assessing essays we decided to use only total judgements. Profiled ratings seemed impossible as some essays were very short. In grade 4 the essays were marked on a five-step scale by 3 teachers, 3 creativity researchers and by 2 teachers who were given taped recordings of the written texts. In grade 6 they were marked by 3 teachers, the same as in grade 4, and by 3 methods lecturers at our school of education. Coder agreements lay around .70 for different groups of teachers, around .50 for creativity researchers. Of the separate language measures within the 87 in our selection the following ten got the highest correlations with the sums of grades.

Table 12. Correlations between language measures and judgements

Grade 4		Grade 6	
Different words	.75	Different words	.79
Punctuation marks	.74	Words used once	.77
Adverbials in S1	.74	Lines	.75
Lines	.73	Words	.75
Words H-G 1-200	.73	Words Allén 1-200	.74
Adverbials p.s.	.73	Words H-G 1-200	.73
Words Allén 1-200	.73	Adverbials p.s.	.72
Words	.73	Adverbials in S1	.72
Different verbs	.72	Punctuation marks	.72
Different adverbs	.72	Punctuation marks sep. sent.	.71

Of these 10 measures, 8 are the same for the two grades. The rank correlation between the grades for all the 87 variables was .89. It is remarkable that "different words" is the best "prox" of all in estimating assessments. It probably represents both productivity and the ability to find appropriate words to express ideas.

For the factors we got results according to the two following tables.

Table 13. Correlations between factors and judgements in grade 4

Productivity	.53
Adjectives - complements to the predicate	.30
Adverbials	.26
Verbs	.28
Attributes	.20
Coordination	.16
Relative clauses	.02
Syntactic sentence length	.18
Word length	.09
Graphic sentence length	-.28

Table 14. Correlations between factors and judgements in grade 6

Productivity, narrative language	.46
Productivity, descriptive language	.43
Adjectives - complements to the predicate	.36
Adverbials	.23
Relative clauses	.10
Syntactic sentence length	.10
Word length	.20
Graphic sentence length	-.18
Subordinate clause length	.24
Attributes	.03

Again, "productivity" proves to be the most important quality of the children's language. This is valid for both grades. Adjectives play a certain role. Observe that the sign is positive for syntactic sentence length, or T-unit length in the Hunt vocabulary, but that graphic sentence length is preceded by a minus. This reflects the markers' difficulty in reading essays with imperfect punctuation.

In all our data treatments, productivity stands as central. In grade 6 the pupils have more of everything than they had in grade 4. In both grades the productivity factors have the highest correlations with judgements. Among the separate language measures, "different words" has a certain position. It has the highest correlation with judgements in both grades. In the number of different words are found both productivity and vocabulary.

Next to productivity, "adjectives - complements to the predicate" has the heaviest weight in both grades. In contrast to studies in the English language, we cannot find any special value in the measure "length of macrosyntagm", which is almost the same as T-unit. The correlation with judgements is positive, but the increment of length is not very great from grade 4 to 6. Graphic sentence has negative correlation with judgement, which reflects the pupils' failing ability to punctuate.

Multiple correlations with criteria take us one step further. Factors as predictors in grade 4 bring the value from .53 - for productivity alone - to a maximum of .83 after 8 steps. In grade 6 the procedure starts with .46 for productivity in narrative language and ends with .85 after 9 steps. The predictive values are thus quite remarkable.

To this we must add an astonishing result. Multiple correlations for computer measures give the maximum value of .86 in grade 4, slightly more than the factors gave. But the value of .83, as a maximum for the factors, was reached after only 3 computer measures. In grade 6 we have .84 after 3 steps and .86 after 4. Thus, all the labor with language

analyses and all the calculations for factor analyses are outweighed by three or four simple facts which a machine can count! These four are given in the table.

Table 15. Computer measures with high multiple correlation with judgements

Grade 4		Grade 6	
Different words	.75	Different words	.79
Words not H-G	.82	Words not Allén	.82
Punctuation marks	.83	Word length, m	.84
Word length, m	.84	Punctuation marks	.86

That three of the four variables are identical and that the fourth implies only a change of wordlist give the results increased credibility.

And the explanation? We will not repeat what we have said many times in the report; let us only remark once again that some proxes are really good in themselves. To this we may add the fact that computer measures are as nearly perfectly reliable as psychological measurements can be.

Let us finally mention that cross-validations were made. The following table is a part of a table by Martinsson.

Table 16. Correlation between estimated and real judgements

Variables	Estimated judgements	Correlation between estimated and real marks
16 data measures weighed according to teacher rating in grade 4	Teacher marks in grade 6	.79
	Lecturer marks in grade 6	.82

The validation is satisfactory. The language measures have proved their value in new situations.

SEX, HOME AND SCHOOL DIFFERENCES IN LANGUAGE?

Lundquist, B. Språkskillnader mellan kön, hem och skolor. Studier inom projektet FRIS (Fri skrivning i skolan). /Sex, home and school differences in language ability. Studies within the FRIS project (Free writing at school)./ Pedagogisk-psykologiska problem (Malmö: School of Education), Nr 350, 1978.

Homes and schools

In Sweden there exists a system for classification into social groups which is based on professions. The FRIS project used descriptions given by Swedner & Gustavsson (1962):

"Social group I:
1. Owners and leaders of larger firms
2. Higher civil servants
3. Employees in private enterprises with university education
4. Persons in independent professions with university education (lawyer, physician and others)
5. Others with university education

Social group IIA:
1. Civil servants on the intermediate level (teacher, postal clerk etc.)
2. Employees in private enterprises on the intermediate level (chief accountant, engineer etc.)
3. Owners of and businessmen within minor enterprises, master craftsmen

Social group IIB:
1. Lower civil servants (higher non-commissioned officer, minor post-office employee etc.)
2. Employees in lower positions in private enterprises (clerk, traveling salesman, shop assistant etc.)
3. Supervisors, foremen
4. Craftsmen (bookbinder, pastry-cook etc.)

Social group III:
1. Lower employees in civil services (postman, lower non-commissioned officer etc.)
2. Skilled workers (fitter, typographer, welder etc.)
3. Non-skilled workers (driver, labourer etc.)"

The "group 191" in the FRIS project had the following distribution.

Table 17. Distribution of group 191 in social groups by home and sex

Sex \ Homes	I	IIA	IIB	III	Total
Boys	25	21	33	18	97
Girls	22	20	26	26	94
Total	47	41	59	44	191

For the schools a "social quotient" was calculated. This was done with the formula

$$SQ = \frac{4xN_I + 3xN_{IIA} + 2xN_{IIB} + 1xN_{III}}{N_I + N_{IIA} + N_{IIB} + N_{III}}$$

The distribution according to this quotient was given in table 1.

As it was considered very important to study the interaction between homes and schools, some calculations were made on the basis of the following table.

Table 18. Distribution by home and school

Homes \ Schools	A	B	C	Total
I	36	8	3	47
IIA	20	13	8	41
IIB	12	20	27	59
III	5	15	24	44
Total	73	56	62	191

It is evident from this table that schools and homes are correlated. χ^2 is 57.64, $p < .001$, the product moment correlation .52.

As it was an important task for the FRIS project to study changes over time, designs were constructed where the two grades entered as factors. The causes of linguistic variance mentioned heretofore were tested in seven designs according to the following table.

Table 19. Variance analysis designs for the study of differences between sex, homes and schools

Design	Levels in factor 1	Levels in factor 2	Levels in factor 3
1. Sex x school	Boys and girls	Schools A, B and C	
2. Sex x home	Boys and girls	Social group I, IIA, IIB and III	
3. Home x school	Social groups I+IIA and IIB+III	Schools A, B and C	
4. School x home	Schools A, B and C	Social groups I, IIA, IIB and III	
5. Sex x school x time	Boys and girls	Schools A, B and C	Grades 4 and 6
6. Sex x home x time	Boys and girls	Social groups I, IIA, IIB and III	Grades 4 and 6
7. School x home x time	School A, B and C	Social groups I, IIA, IIB and III	Grades 4 and 6

Sex differences

Tests of intelligence, verbal ability and creativity give only a few, scattered differences, where sometimes boys, sometimes girls, have the highest results. The differences in attitude tests are more systematic; many are highly significant. The results form a pattern, with girls favoring personal, social, verbal and esthetic interests whereas the boys prefer reality, technology and sports. In the girls' verbal interests also lies free writing, especially if it has a personal touch.

The results from the two central essays within the FRIS project, "At the museum" in grade 4 and "At the camping ground" in grade 6, are shown in the following compact table, which is combined from two tables by Lundquist. Variables are the now well-known 87. The symbols stand for:

x	$.01 < p \leq .05$
xx	$p \leq .01$
x and xx	$\hat{\omega}^2$ is simultaneously $\geq .05$.

The significant differences are many. Let us first establish that word and sentence length are not significant. To this we can add that differences for proportions are not at all as dominant as those in the table. It is, thus, language productivity that differs between the sexes, not language usage.

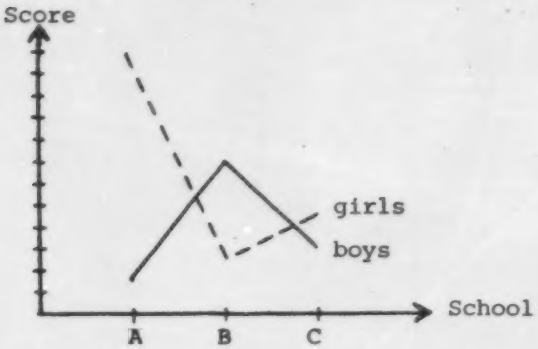
Table 20. Sex differences in 87 language measures, grades 4 and 6

Key to the signs: x .01 < p ≤ .05
xx $p \leq .01$
x and xx "' is simultaneously ≥ .05

Variable	Grade 4						Grade 6					
	Design 1 Sex x school			Design 2 Sex x home			Design 1 Sex x school			Design 2 Sex x home		
	b,g sex	A B C school	s x s interaction	b,g sex	I,IIA IIB,III home	s x h interaction	b,g sex	A B C school	s x s interaction	b,g sex	I,IIA IIB,III home	s x h interaction
1. Graph sentence	x		x	x			xx			xx		
2. Macrosyntagm			xx				xx			xx		
3. Words/GS, m		x'										x
4. Words/GS, s												
5. Words/MS, m												
6. Words/MS, s			xx				x	xx		x	x	
7. Sub. cl. 1000			x	x			xx			xx		
8. Sub. cl. tot.	xx		xx	xx	xx	x	xx			xx		
9. Words/sub. cl. 1000, m												
10. Words/sub. cl. 1000, s							x			x		
11. Deep coeff.	x		xx	x			xx			xx		
12. Clauses	x		xx	x			xx			xx		
13. Affirm Sent			x				xx			xx		
14. Rel. clauses					x		xx			xx	x	
15. Coord. phrases			x				xx	xx		xx		
16. Clause depth	xx		x	xx	xx		xx	x		xx	x	
17. Lines	x		xx	x	x		xx	x		xx		
18. Words	x		xx	x	x		xx	x		xx		
19. Diff. words			xx	x	xx		xx	x		xx		
20. Words used once			xx		xx		xx	x		xx	x	
21. Word length, m											x	
22. Word length, s												
23. Words Allén 1-200	xx		xx	xx	x		xx			xx		
24. Words H-G 1-200	xx		xx	xx	x		xx			xx		
25. Words Allén 201-601	xx		xx	xx			xx			xx		
26. Words H-G 201-600	xx		xx	xx			xx			xx		
27. Words not Allén			xx				xx	xx		xx		
28. Words not H-G			x		x		xx	xx		xx	x	
29. Common nouns			x	x	xx		xx	xx		xx		
30. Diff. common nouns					xx		xx	xx		xx		
31. Nouns			x		x		xx	xx		xx		
32. Diff. nouns					x		xx	xx		xx		
33. Pronouns	x		x	xx			xx			xx		
34. Diff. pronouns	xx			xx			xx			xx		
35. Numerals					xx		xx	x		x		
36. Adjectives	xx		xx	xx			xx	x		xx		
37. Diff. adj.	xx		xx	xx			xx	x		xx		
38. "Be"	xx			xx			xx			xx		
39. Head verbs			xx	x			xx	x		xx		
40. Diff. head verbs			xx	x	x		xx	x		xx	x	
41. Verbs	xx		xx	xx'			xx			xx		
42. Diff. verbs	x		xx	x	x		xx	x		xx	x	
43. Adverbs	xx		xx	xx			xx			xx		
44. Diff. adverbs	xx		xx	xx	xx		xx	x		xx		
45. Prepositions			x		x		xx	x		xx		
46. Diff. prep.					xx		xx			xx		
47. Coord. conj.			xx				xx	x		xx		
48. Diff. coord. conj.							x					
49. Definite articles	x		x					xx				
50. Def. pronouns	xx		xx	xx			xx			xx		
51. Pers. pron.							xx			xx		
52. Verbs in preteritum	x		x	x			xx			xx		
53. Def. adverbs							xx			xx		
54. Rel. adverbs			x									
55. Remaining adverbs	xx		xx	xx	x		xx			xx		
56. The word "och" /and/			x				xx	xx		xx		
57. Words for persons			x				xx			xx		
58. Common subjects	x		xx	xx	x		xx			xx		
59. Common subj. p.s.	x		xx	x			xx			xx		
60. Subjects	x		xx	xx	x		xx			xx		
61. Subjects p.s.	x		xx	x			xx			xx		
62. Finite predicate verbs	x		xx	xx			xx			xx		
63. Fin. pred. verbs p.s.	x		xx	x			xx			xx		
64. Infinite verbs	xx		xx	xx			xx			xx		
65. Inf. verbs p.s.	xx		xx	xx			xx			xx	x	
66. Predicate verbs	xx		xx	xx			xx			xx		
67. Pred. verb p.s.	xx		xx	xx			xx			xx		
68. Complements of the pred.	x			x			xx		x	xx		
69. Compl. of the pred. p.s.	x			x			xx			xx		
70. Direct objects			xx				xx	x		xx		
71. Direct objects p.s.			xx				xx	x		xx		
72. Objects			xx				xx	x		xx		
73. Objects p.s.			xx				xx	x		xx		
74. Adverbials of place					x	x	xx	x		xx		
75. Adv. of place p.s.						x	xx	x		xx		
76. Adverbials of time							xx			xx		
77. Adv. of time p.s.							xx			xx		
78. Adverbials in column 3			x		xx		xx	x		xx		
79. Adverbials p.s.	x		xx	x	xx		xx	x		xx		
80. Verb particle	x		xx	xx								
81. Determining attributes in S2	xx		x	xx	xx		xx			xx		
82. Attributes in S2	x		x	xx	xx		xx			xx		
83. Prepositions in S2			x		x		xx			xx		
84. Punct marks separ sentences	x		x	x			xx			xx		
85. Punct marks	x		xx	x			xx			xx		
86. Remaining L-measures	xx		xx	xx			xx		xx	xx		
87. Remaining S-measures	xx			xx			xx			xx		

In grade 4 we have an interaction between sex and school, which Lundquist has illustrated as follows.

Figure 1. Typical interaction in the design sex x school, grade 4

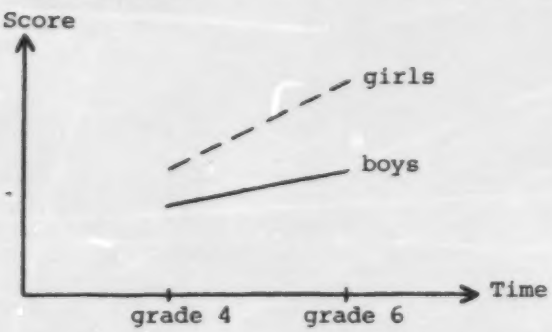


Although the interaction is significant in many cases, we regard it as random. No "deeper" interpretation can be made of this by all probability accidental case. In grade 6 this interaction has disappeared and the differences between the sexes make a very strong impression.

Judgements also differ strongly between the sexes. This a natural consequence of our earlier finding that productivity has a high correlation with ratings.

In designs where time has entered as a third factor, a very significant development between the grades is shown. This is the same result as Martinsson found, of course. A significant interaction also exists between sex and time. This could be foreseen from table 6. Lundquist shows the development by means of a new figure.

Figure 2. Typical interaction for sex x time



Some sex differences can be found in the use of individual words (but the overwhelming number of words have none). Lundquist gives two lists of words characterizing the sexes. The first includes nouns of a special kind.

Table 21. Words for persons used by girls and boys in grade 4

Girls' words	Boys' words
boy (!)	Tarzan
Lotta	I
boys	Ulf
the boys	Anders
classes	Karin
teacher (woman)	Per
schoolmaster (man)	Mats
Eva	Stefan
girls	Kalle
teacher	Pelle
class	Peter
the children	
the girls	
the boy	

Lotta and Eva are proper names for girls. All the words in the boys' list, with the exception of Tarzan and I, are Swedish proper names; all except Karin are boys' names.

The second list from Lundquist includes verbs.

Table 22. Verbs used by girls and boys in grade 4

Girls' verbs	Boys' verbs
kept	played
looked	read
play	started
was	play
stopped	shot
said	dashed
did	
taken	
come	
stood	

According to Lundquist, the boys use more words for initiative and action while the girls' words are characterized by more calm.

To sum up, both boys and girls produce more at the end of the intermediate stage than at the beginning. On both occasions girls produce more than the boys, and their increase rate is higher. Differences are few when the influence of length is ruled out. These results can perhaps be explained by the attitudes to writing. Girls find writing more interesting than boys do, and they therefore probably engage more willingly in writing activities.

Differences between homes

Lundquist gives a short account of the literature regarding social differences in language. Among the references we find Bernstein, Hawkins, Brandis & Henderson and Lawton and among Nordic researchers, Grundin and Einarsson.

The resulting picture for homes is quite different from that for sexes. In the first place we notice clear differences in tests of intelligence and verbal ability. The following table is taken from Lundquist.

Table 23. Results for homes on intelligence and verbal tests

Variable	Differences in design 2: sex x home	Directions and contrasts
Intelligence tests		
Picture arrangement	xx	I > IIA > IIB > III
Sentence completion	x	I > IIA > IIB > III
Abstractions	x	I > IIA > IIB > III
Puzzle	xx	I > IIA > IIB > III
Analogies	xx	I > IIA > IIB > III
Total		
Verbal tests		
Style test Adjective	xx	I > IIA > IIB > III
Dividing into sentences		
Word knowledge Adjective	xx	I > IIA > III > IIB
Style test Verb	xx	I > IIA > IIB > III
Disposition	xx	I > IIA > IIB > III
Correctness	x	I > IIA > IIB > III
Creativity tests		
Improvements		
Verbs	x	I > IIA > IIB > III
Consequences		
Sentence completion		
Uses		
Abbreviations		
Total		

For directions and contrasts the following symbols apply (for the sake of simplicity we give only three groups):

I II III	All groups differ significantly.
I II III	III differs significantly from I and II, I and II do not differ.
I II III	I differs from II and III, II and III do not differ.
I II III	I differs from III, I does not differ from II and II not from III.
I II III	No significant differences exist.

The order between the homes is very regular. Only in one case, Word knowledge Adjective, do we have a shift between IIB and III. For the

creativity tests the differences are small or none.

The social groups are much more alike in the attitude tests. Within 17 possible differences only one, for "Fantasy story", is significant with the order I, IIA, IIB and III. For "Social and manual interests" the order is almost reversed: IIB, III, IIA and I, and for "Matter-of-fact descriptions" directly reversed, i.e. III, IIB, IIA and I.

When we turn to the essays, the differences between homes are much less obvious. They exist, however, in 29 of 79 language measures in grade 4 that are dependent on length. In these cases the order between the groups is very regular: I, IIA, IIB and III. Of interest is that measures of vocabulary, i.e. different words and words used once, separate more strongly than the number of words. Further, the measures 8, Subordinate clauses, and 16, Clause depth, show relatively strong differences. These facts indicate that vocabulary and language complexity distinguish between social groups. But this goes only for grade 4. In grade 6 almost every difference has disappeared! This we regard as another of our most important results. It has been argued that school increases the differences between social groups. In our project the contrary is valid.

Again, Lundquist goes back to the attitude tests to find an explanation. No differences could be stated for these. Are perhaps the similar attitudes the cause of the lack of social differences in our FRIS project?

Differences between schools

This topic can be briefly treated. We refer to the three schools according to table 1. They had been chosen by the aid of "social quotients", which in turn were calculated on the basis of the parents' occupations. In the tests of intelligence, verbal ability and creativity the differences were few and randomly scattered, and in two cases of five the order was B, A and C. The pupils' attitudes to activities in writing were almost the same.

In the essays, too, the differences were few and only rarely of a strength worth mentioning. Where differences do exist, especially for productivity in grade 6, the order is mostly A, B and C, but the tendency is not always the same. Common and systematic traits are difficult to find.

These are of course important findings. In Sweden a debate has been conducted about school segregation, and the argument has sometimes been

brought up that schools, by their recruiting, tend to preserve social differences or even increase them. In the case of free writing we have not been able to confirm this suspicion. Of course the matter can be studied in more detail, and this brings us to the next paragraph.

Homes and schools in interaction

The existence of interaction between homes and schools should be found in the designs 3, 4 and 7 by Lundquist, see table 19. The results are unusually convincing. In grade 4 not a single significant interaction effect is found, in grade 6 two, when the possibility is 4 x 87! This goes for designs 3 and 4. For design 7, where time comes in as a third factor, we give a whole table because of its enormously consistent results. It might be argued that if school had any effect on social inequalities during the three year period of the project, these should appear in the triple interaction time x home x school. But this column has only two barely significant values. On the other hand, education and growth have the effects strongly manifested in the column for time. This result, general but not differential growth, has also been found by Grundin (1976).

Table 24. Differences between schools, homes and times in 87 language measures

Key to the signs: x .01 < p ≤ .05
xx p ≤ .01
x and xx Ω^2 is simultaneously ≥ .05

Variable	Design 7 school(A,B,C) x home(I,IIA,IIB,III) x time(gr 4,6)							
	school	home	time	s x h	s x t	h x t	s x h x t
1. Graph sentence			xx				
2. Macrosyntagm			xx				
3. Words/GS, m	xx						
4. Words/GS, s	x		x				
5. Words/MS, m			x				
6. Words/MS, s			xx				
7. Sub. cl. 1000			xx				
8. Sub. cl. tot.			xx				
9. Words/sub. cl. 1000, m							
10. Words/sub. cl. 1000, s			xx				
11. Deep coeff.			xx				
12. Clauses			xx				
13. Affirm Sent			xx				
14. Rel. clauses			xx			xx	
15. Coord. phrases			xx		x		
16. Clause depth			xx			x	
17. Lines			xx				
18. Words			xx				
19. Diff. words			xx				
20. Words used once			xx				
21. Word length, m		x	xx				
22. Word length, s			xx				x
23. Words Allén 1-200			xx				
24. Words H-G 1-200			xx				
25. Words Allén 201-601			xx				
26. Words H-G 201-600			xx		x		
27. Words not Allén			xx				
28. Words not H-G			xx				
29. Common nouns			xx		x		
30. Diff. common nouns			xx				
31. Nouns			xx				
32. Diff. nouns			xx				
33. Pronouns			xx				
34. Diff. pronouns			xx				
35. Numerals			xx			xx	
36. Adjectives			xx				
37. Diff. adj.			xx				
38. "Be"			xx			x	
39. Head verbs			xx				
40. Diff. head verbs			xx				
41. Verbs			xx				
42. Diff. verbs			xx				
43. Adverbs			xx				
44. Diff. adverbs			xx				
45. Prepositions			xx				
46. Diff. prep.			xx				
47. Coord. conj.			xx				
48. Diff. coord. conj.			xx				
49. Definite articles			xx				
50. Def. pronouns			xx				x
51. Pers. pron.			xx				
52. Verbs in preteritum			xx				
53. Def. adverbs			xx				
54. Rel. adverbs			xx				
55. Remaining adverbs			xx				
56. The word "och" /and/			xx				
57. Words for persons			xx				
58. Common subjects			xx			x	
59. Common subj. p.s.			xx				
60. Subjects			xx			x	
61. Subjects p.s.			xx				
62. Finite predicate verbs			xx				
63. Fin. pred. verbs p.s.			xx				
64. Infinite verbs			xx				
65. Inf. verbs p.s.			xx				
66. Predicate verbs			xx				
67. Pred. verbs p.s.			xx				
68. Complements of the pred.			xx				
69. Compl. of the pred. p.s.			xx				
70. Direct objects			xx				
71. Direct objects p.s.			xx				
72. Objects			xx				
73. Objects p.s.			xx				
74. Adverbials of place	x		xx				
75. Adv. of place p.s.	x		xx				
76. Adverbials of time			xx				
77. Adv. of time p.s.			xx				
78. Adverbials in column S1			xx				
79. Adverbials p.s.			xx				
90. Verb particle			xx				
81. Determining attributes in S2			xx				
82. Attributes in S2			xx				
83. Prepositions in S2			xx				
84. Punct marks separ sentences			xx				
85. Punct marks			xx				
86. Remaining L-measures			xx				
87. Remaining S-measures			xx				

Petterson, I.-L. Kreativ skrivning. En studie inom projektet FRIS (Fri skrivning i skolan). /Creative writing. A study within the FRIS project (Free writing at school)./ Pedagogisk-psykologiska problem (Malmö: School of Education), Nr 352, 1978.

In an overview of research in the field of creative writing Petterson refers to Fishco, Guilford, Torrance, Carlsson, Yamamoto, Belasco and Page & Paulus, all of these working on the English language.

When studying creative language the problem of criteria immediately arises. From the FRIS material Petterson chooses two, namely, in grade 4, the rating made by researchers in the area of creativity, and, in grade 6, the results from our six creativity tests. Ratings as well as tests have been described earlier in this report. Although these two measurements are both intended to assess creativity, their intercorrelations are low. The following table is given by Petterson.

Table 25. Correlations between creativity judgement of essays and creativity tests

Tests	Correlation with judgement
Improvements	.20
Consequences	.26
Uses	.09
General creativity tests	.24
Verbs	.26
Sentence completion	.12
Abbreviations	.20
Verbal creativity tests	.26
Creativity tests total	.27

When trying to define the creative language Petterson uses the 87 language measures. In grade 4 the values from the essay "At the museum" are correlated with the ratings, and in grade 6 the values from "At the camping ground" are correlated with the sum of the six creativity tests. In the following table, which is a combination of two separate ones by Petterson, are added the correlations with teacher judgements in grade 4 for the sake of comparison. As the teachers and the creativity researchers did not have the same instructions for rating, the differences could give some hints as to what distinguishes creativity.

It should first of all be noted that the test correlations are considerably lower than those for ratings. Let us also observe that the

Table 26. The correlations of the 87 language measures with judgements and creativity tests

Variable	Creativity judgement	Creativity tests	Teacher judgement	Rank Cr j	Rank Cr t	Rank T j	Diff Cr j-Cr t	Diff Cr j-T j	Diff Cr t-T j
1. Graph sentence	.58	.34	.59	55.0	69.0	82.5	-14.0	-27.5	-13.5
2. Macrosyntagm	.64	.32	.46	70.5	60.0	42.0	10.5	28.5	18.0
3. Words/GS, m	-.08	-.16	-.25	2.0	2.0	1.0	.0	1.0	1.0
4. Words/GS, s	.15	-.21	-.05	6.0	1.0	2.0	5.0	4.0	-1.0
5. Words/MS, m	-.11	-.07	.05	1.0	3.0	4.0	-2.0	-3.0	-1.0
6. Words/MS, s	.25	.03	.26	8.0	5.0	9.0	3.0	-1.0	-4.0
7. Sub. cl. 1000	.56	.28	.51	50.0	38.5	56.0	11.5	-6.0	-17.5
8. Sub. cl. tot.	.53	.30	.50	40.5	51.5	51.5	-11.0	-11.0	.0
9. Words/sub. cl. 1000, m	-.02	-.04	0	3.0	4.0	3.0	-1.0	.0	1.0
10. Words/sub. cl. 1000, s	.29	.05	.13	10.0	6.0	5.0	4.0	5.0	1.0
11. Deep coeff.	.51	.24	.47	34.5	22.5	44.5	12.0	-10.0	-22.0
12. Clauses	.65	.35	.51	75.5	76.0	56.0	-.5	19.5	20.0
13. Affirm Sent	.64	.38	.48	70.5	87.0	47.5	-16.5	23.0	39.5
14. Rel. clauses	.26	.16	.24	9.0	13.0	7.0	-4.0	2.0	6.0
15. Coord. phrases	.41	.21	.38	19.5	17.5	24.5	2.0	-5.0	-7.0
16. Clause depth	.36	.26	.34	14.5	28.5	17.5	-14.0	-3.0	11.0
17. Lines	.67	.34	.57	82.0	69.0	77.5	13.0	4.5	-8.5
18. Words	.66	.34	.56	79.0	69.0	74.5	10.0	4.5	-5.5
19. Diff. words	.67	.36	.59	82.0	80.5	82.5	1.5	-.5	-2.0
20. Words used once	.64	.37	.55	70.5	84.0	72.0	-13.5	-1.5	12.0
21. Word length, m	.04	.20	.31	4.0	15.0	13.0	-11.0	-9.0	2.0
22. Word length, s	.10	.11	.32	5.0	9.0	15.0	-4.0	-10.0	-6.0
23. Words Allén 1-200	.64	.30	.59	70.5	51.5	82.5	19.0	-12.0	-31.0
24. Words H-G 1-200	.64	.30	.60	70.5	51.5	85.0	19.0	-14.5	-33.5
25. Words Allén 201-601	.52	.26	.52	37.5	28.5	62.0	9.0	-24.5	-33.5
26. Words H-G 201-600	.57	.25	.58	53.0	25.5	80.0	27.5	-27.0	-54.5
27. Words not Allén	.61	.36	.43	64.0	80.5	31.5	-16.5	32.5	49.0
28. Words not H-G	.58	.37	.37	55.0	84.0	21.5	-29.0	33.5	62.5
29. Common nouns	.52	.31	.51	37.5	55.5	56.0	-18.0	-18.5	-.5
30. Diff. common nouns	.52	.32	.52	37.5	60.0	62.0	-22.5	-24.5	-2.0
31. Nouns	.54	.32	.45	43.5	60.0	39.0	-16.5	4.5	21.0
32. Diff. nouns	.50	.33	.44	32.0	64.5	35.0	-32.5	-3.0	29.5
33. Pronouns	.59	.28	.54	58.0	38.5	69.0	19.5	-11.0	-30.5
34. Diff. pronouns	.47	.27	.57	27.0	32.5	77.5	-5.5	-50.5	-45.0
35. Numerals	.39	.25	.33	18.0	25.5	16.0	-7.5	2.0	9.5
36. Adjectives	.51	.28	.49	34.5	38.5	50.0	-4.0	-15.5	-11.5
37. Diff. adj.	.53	.27	.51	40.5	32.5	56.0	8.0	-15.5	-23.5
38. "Be"	.37	.15	.34	16.5	12.0	17.5	4.5	-1.0	-5.5
39. Head verbs	.67	.37	.51	82.0	84.0	56.0	-2.0	26.0	28.0
40. Diff. head verbs	.68	.37	.51	85.0	84.0	56.0	1.0	29.0	28.0
41. Verbs	.65	.35	.54	75.5	76.0	69.0	-.5	6.5	7.0
42. Diff. verbs	.69	.35	.53	87.0	76.0	66.0	11.0	21.0	10.0
43. Adverbs	.60	.28	.55	61.0	38.5	72.0	22.5	-11.0	-33.5
44. Diff. adverbs	.61	.29	.59	64.0	45.0	82.5	19.0	-18.5	-37.5
45. Prepositions	.59	.29	.48	58.0	45.0	47.5	13.0	10.5	-2.5
46. Diff. prep.	.48	.29	.44	28.5	45.0	35.0	-16.5	-6.5	10.0
47. Coord. conj.	.43	.22	.37	21.0	19.5	21.5	1.5	-.5	-2.0
48. Diff. coord. conj.	.41	.09	.30	19.5	8.0	11.0	11.5	8.5	-3.0
49. Definite articles	.52	.37	.39	37.5	84.0	27.0	-46.5	10.5	57.0
50. Def. pronouns	.49	.14	.38	30.0	11.0	24.5	19.0	5.5	-13.5
51. Pers. pron.	.37	.23	.29	16.5	21.0	10.0	-4.5	6.5	11.0
52. Verbs in preteritum	.61	.31	.48	64.0	55.5	47.5	8.5	16.5	8.0
53. Def. adverbs	.32	.13	.14	12.0	10.0	6.0	2.0	6.0	4.0
54. Rel. adverbs	.23	.08	.25	7.0	7.0	8.0	.0	-1.0	-1.0
55. Remaining adverbs	.55	.29	.57	46.5	45.0	77.5	1.5	-31.0	-32.5
56. The word "och" /and/	.32	.20	.31	12.0	15.0	13.0	-3.0	-1.0	2.0
57. Words for persons	.63	.25	.43	66.5	25.5	31.5	41.0	35.0	-6.0
58. Common subjects	.60	.35	.55	61.0	76.0	72.0	-15.0	-11.0	4.0
59. Common subj. p.s.	.64	.35	.51	70.5	76.0	56.0	-5.5	14.5	20.0
60. Subjects	.58	.34	.54	55.0	69.0	69.0	-14.0	-14.0	.0
61. Subjects p.s.	.63	.34	.52	66.5	69.0	62.0	-2.5	4.5	7.0
62. Finite predicate verbs	.65	.34	.52	75.5	69.0	62.0	6.5	13.5	7.0
63. Fin. pred. verbs p.s.	.65	.34	.52	75.5	69.0	62.0	6.5	13.5	7.0
64. Infinite verbs	.50	.27	.45	32.0	32.5	39.0	-.5	-7.0	-6.5
65. Inf. verbs p.s.	.50	.27	.45	32.0	32.5	39.0	-.5	-7.0	-6.5
66. Predicate verbs	.66	.35	.53	79.0	76.0	66.0	3.0	13.0	10.0
67. Pred. verbs p.s.	.66	.35	.53	79.0	76.0	66.0	3.0	13.0	10.0
68. Complements of the pred.	.32	.24	.38	12.0	22.5	24.5	-10.5	-12.5	-2.0
69. Compl. of the pred. p.s.	.36	.20	.40	14.5	15.0	29.0	-.5	-14.5	-14.0
70. Direct objects	.55	.29	.44	46.5	45.0	35.0	1.5	11.5	10.0
71. Direct objects p.s.	.56	.30	.40	50.0	51.5	29.0	-1.5	21.0	22.5
72. Objects	.56	.28	.44	50.0	38.5	35.0	11.5	15.0	3.5
73. Objects p.s.	.56	.30	.40	50.0	51.5	29.0	-1.5	21.0	22.5
74. Adverbials of place	.54	.27	.35	43.5	32.5	19.0	11.0	24.5	13.5
75. Adv. of place p.s.	.54	.29	.36	43.5	45.0	20.0	-1.5	23.5	25.0
76. Adverbials of time	.45	.22	.38	24.0	19.5	24.5	4.5	-.5	-5.0
77. Adv. of time p.s.	.44	.21	.31	22.5	17.5	13.0	5.0	9.5	4.5
78. Adverbials in column S1	.68	.32	.56	85.0	60.0	74.5	25.0	10.5	-14.5
79. Adverbials p.s.	.68	.33	.57	85.0	64.5	77.5	20.5	7.5	-13.0
80. Verb particle	.48	.32	.47	28.5	60.0	44.5	-31.5	-16.0	15.5
81. Determining attributes in S2	.44	.28	.48	22.5	38.5	47.5	-16.0	-25.0	-9.0
82. Attributes in S2	.46	.32	.50	25.5	60.0	51.5	-34.5	-26.0	8.5
83. Prepositions in S2	.60	.27	.46	61.0	32.5	42.0	28.5	19.0	-9.5
84. Punct marks separ sentences	.56	.32	.61	50.0	60.0	86.0	-10.0	-36.0	-26.0
85. Punct marks	.59	.29	.63	58.0	45.0	87.0	13.0	-29.0	-42.0
86. Remaining L-measures	.54	.30	.44	43.5	51.5	35.0	-8.0	8.5	16.5
87. Remaining S-measures	.46	.25	.46	25.5	25.5	42.0	.0	-16.5	-16.5

three criteria give rather similar rankings of the language measures. The rank coefficients for creativity judgements and tests are .83, for the two judgements .77, and for tests and teacher judgements .66. As a consequence of this connection, some language measures are rated high in all criteria. Among these are different words, words used once, lines and words, i.e. manifestations of productivity. Different measurements of sentence length have low correlations.

In table 36 the column for differences between creativity and teacher ratings gives information about what our creativity researchers have looked upon as more valuable. The biggest divergence we find is for "words for persons". Great discrepancy is also found for words not in wordlists, i.e. uncommon words. Creativity researchers also pay value to verbs, objects and adverbials of place. These three language facts point to an "action style" with many incidents.

The largest difference in the other direction belongs to "different pronouns". Unfortunately this finding is difficult to interpret. Two other results are more elucidative. One is that nominal constructions with nouns and attributes are appreciated by the teachers. The other is that teachers appreciate essays with graphic sentences and punctuation marks, indicating that the pupils have clearly defined their ideas by aid of punctuation.

The results must not be interpreted to mean that teachers are unconcerned with creativity, only that they take other aspects into consideration as well. This is wholly in accordance with directions in the Swedish curriculum, where correctness is one of the aims. Perhaps, too, the calm descriptive style with nominal constructions has a touch of creativity. Caricaturing, the exaggerated action, on the other hand, has been named the "Donald Duck style", which certainly does not stand for creativity of a more qualitative kind.

Petterson, I.-L. Barnspråk och vuxenspråk. En studie inom projektet FRIS (Fri skrivning i skolan). /Child language and adult language. A study within the FRIS project (Free writing at school)./ Pedagogisk-psykologiska problem (Malmö: School of Education), Nr 353, 1978.

In her review of earlier research Petterson mentions Klingberg (1968), who compares authors' language when they write for adults and for children. He chooses three Swedish writers who have written books for both adults and children. The "adaptation" for children involves shorter sentences, shorter words (which also means fewer abstract words), fewer nouns but more verbs. Klingberg stresses that this adaptation does not mean lowered esthetic quality.

Grandin (1974) takes two books by the same author, one for adults and one for children. Then, from the FRIS material, she takes the essays concerning a theme which was also found in the children's book, i.e. a visit to an amusement park. She finds differences between the adult book and the children's book but similarities between the children's book and the essays. The adult book has more different words, long and unusual words and a language of the nominal type.

In a large study in England, Card & McDavid (1965) have compared word frequencies from three types of language: children's writing, adults' informal and adults' formal writing. The children used "I", "you" and "we" more often. "My" was common among children, "your" in informal adult language, and "his", "our" and "their" more common in formal language writing. The children link sentences with the words "and", "but" and "so", while adults use "few", "same" and "such", which give better precision. Verbs are more common with children.

Within FRIS the children were given six themes. For each theme some hints about the content were written. See the following table. The essays came from the experiment named "The children's book" (p. 53).

Table 27. Themes and content in the FRIS study "The children's book"

Theme	Content description
1. The wonderful rescue	This book deals with the rescue of a friend from a big danger.
2. A day at the Zoo	This book deals with a walking-tour among the animals.
3. An imaginary friend	This book deals with what you want a friend to be like.
4. An evening at the amusement park	This book deals with what you can do at an amusement park.
5. An exciting competition	This book deals with a competition with an unexpected result.
6. Run away plans	This book deals with ideas of running away from home.

Every child got his own small booklet, where he had to write his own name as the author on the front page. The next figure shows this page for theme 1.

DEN UNDERBARA RÄDDNINGEN
(The Wonderful Rescue)
Författare
(Author)
Den här boken handlar om att rädda en kamrat ur en stor fara.
(This book deals with the rescue of a friend from a big danger.)

For each theme two texts from children's books were chosen as material for the comparisons, 12 texts in all. The selection of these was made in cooperation with literature experts and librarians. From the texts word samples were cut out in such a way that they were as nearly as possible equally long as the mean of the essays about the same theme. The division was, however, always made at a full stop, which allows for small deviations of length.

The FRIS project had no resources for a complete linguistic analysis in this case. For calculations Petterson therefore used what we called "computer measures", described in Martinsson's reports. Petterson also had an opportunity to include some measures which in other investigations had represented quality, positively or negatively. You find them in the following table.

Table 28. Linguistic variables used as predictors of quality

Auxiliary verbs (-)
Pronouns (-)
Subordinating conjunctions (-)
Coordinating conjunctions (+)
Non-neutral pronouns and articles (+)
Prepositions (+)
Banal words (-)
Negatives (-)

Many auxiliary verbs do not indicate high quality, hence the minus sign; prepositions do, and therefore they are marked with a plus. Among the "banal words" we find for instance: but, can, have, is, it, many, much, not, one, or, then, there, was, we.

The following table is a concentrated overview of information given by Petterson. In combinations like 7-5 the first figure gives the value for children's books, i.e. adult writers, the last for children's essays.

Table 29. Differences between children's books and essays

Variable	Significant differences	All differences
Adults have more of:		
Diff. words	9- 0	12- 0
Words used once	10- 0	12- 0
Letters	5- 0	12- 0
Word length, m	11- 0	11- 1
Word length, s	10- 1	10- 2
Long words	10- 0	10- 2
Words H-G 201-600	8- 2	10- 2
Words Allén 602-1007	7- 1	9- 2
Words H-G 601-1000	7- 1	10- 2
Words not Allén	5- 0	8- 4
Words not H-G	5- 0	10- 2
Diff. words Allén 1-200	6- 0	10- 2
Diff. words H-G 201-600	9- 0	11- 1
Diff. words Allén 602-1007	9- 1	11- 1
Diff. words H-G 601-1000	8- 1	10- 2
Diff. words not Allén	10- 0	12- 0
Diff. words not H-G	9- 0	12- 0
Prepositions	5- 0	11- 1
Punct marks	6- 2	10- 2
Words/GS, s	6- 2	8- 4
No systematic difference for:		
Words Allén 201-601	3- 3	7- 5
Diff. words H-G 1-200	3- 4	5- 7
Diff. words Allén 201-601	5- 2	8- 4
Graph sentence	3- 5	4- 8
Punct marks separ sentences	3- 5	6- 6
Words/GS, m	5- 4	5- 7
Coord. conj.	3- 2	8- 4
Non-neutral pron. and art.	3- 2	5- 7
Negatives	4- 3	6- 6
Children have more of:		
Words Allén 1-200	0- 2	3- 9
Words H-G 1-200	0- 4	0-12
Auxiliary verbs	1- 8	1-11
Pronouns	1- 6	1-11
Subord. conj.	2- 7	4- 8
Banal words	0-10	0-12

The methodology of these studies makes it impossible to assess the importance of productivity. In spite of this, the characteristic differences point in the same direction as Martinsson's studies of development and judgement do. Adults have more different words, words used once and unusual words, i.e. words not among the first thousand in our frequency lists. As a consequence they have more letters. The relation 12-0, which applies to these measures, has the probability of 1/4096. 11-1 and 10-2 are also significant, if we accept $p \leq .05$. But perhaps, as we have only one essay value in each comparison, we should count only

the relation 6-0 as significant with a probability of 1/64.

With these numbers in mind we should also point to word length as an important trait in adult language. This might be a consequence of more precise word choice. Punctuation marks also differ between children's essays and the books. In our previous reports we have repeatedly mentioned children's difficulties with sentence separation. Prepositions occur more frequently with adults, which is an indication of nominal style.

On the other hand, children use more of the most common words, more pronouns and auxiliary verbs and more banal words. This is, so to speak, the mirror image of the results mentioned above.

Studies of individual words confirm other findings. Among words used more by adults we especially find prepositions. Pronouns, too, are rather common with adults. Children, on the other hand, have several verbs, many of which indicate movement or direction, e.g. "came", "went", "run". They have more nouns, including some proper names. Other nouns indicate time. A fixation on time is typical of children's essays. The pronouns "I" and "we" are also characteristic of children's usage. Children like to write about themselves.

Petterson, I.-L. Stimulering inför fri skrivning i skolan: Attityder samt effekter av försök med varierade stimuleringsåtgärder. En studie inom projektet FRIS (Fri skrivning i skolan). /Stimulating free writing at school: Attitudes and effects of experiments with different stimuli. A study within the FRIS project (Free writing at school)./ Pedagogisk-psykologiska problem (Malmö: School of Education), Nr 351, 1978.

The general impression of Petterson's review of the literature is that stimulation pays. The ways of stimulating are almost innumerable, varying from life itself to a short list of key words. Perhaps it is most interesting to listen to a few voices which do not fall into this unanimous choir.

Edmund (1958) found that younger children wrote better essays if they had access to secondary experience than if they had only primary. He interprets this finding such that it is easier for these children to express themselves through ideas and styles in texts they like than to find their own words. May we draw the conclusion that reading is a way of gathering tools for writing?

Ewing (1967) compared four ways of stimulating. Minimal stimulation consisted of only an invitation to write, auditory of music, visual of a film without words. Finally, the pupils got motor stimulation by drawing a picture. Essays written after minimal stimulation got the highest judgements. When studying subgroups Ewing found that children of high social status got the best results with minimal stimulation, whereas children of lower status performed better with auditory and visual stimulation. These results are explained by referring to the richer earlier experience of the first-mentioned children.

Woodfin demonstrated an important prerequisite for writing in two experiments (1969, 1972). Pupils wrote for three different time periods: 20 minutes, 90 minutes and without a time limit. The group with unlimited time was rated best in each of five repetitions of the experiment. Girls and highly intelligent children wrote better in the shorter periods, but when time was sufficient these differences disappeared.

Activities in writing

From the Swedish curriculum 19 writing activities were extracted. These were included in an attitude test, built as a five-point Likert scale,

from very boring to very pleasant. A factor analysis was also performed on the basis of the answers from our "group 191". The following tables present items with loadings of, or above, .35, ordered according to the value of the loading. We do not, however, give the loadings here but the "popularity value" expressed on the five-point scale, where 3 is neutral and higher values indicate positive ratings.

Table 30. Activities within the factor Free narrative writing

Item	Children's rating
Write a story to pictures	2.60
Write about a trip for school children	2.86
Write a story from your own fantasy	3.95
Write a story to a heading	2.63
Tell about something real you have taken part in	3.58
Write messages to others or notices for the notice-board	3.13

The words "tell" and "story" characterize the items within this factor.

Table 31. Activities within the factor Free personal writing

Item	Children's rating
Write in own diary	3.25
Correct own writings	3.09
Write a letter to a friend	3.54
Write a story with given words	1.91
Read stories written by your friends	3.71

The activities are rather free in this factor, too. Here they are more ego-centered into the person of the writer.

Table 32. Activities within the factor Bound writing

Item	Children's rating
Write and account for a project in the general subjects	3.21
Write in the paper or the book of the class	3.07
Write a play with roles	2.88
Write keywords	1.91
Write a story to a heading	2.63
Write messages to others or notices for the notice-board	3.13

The activities within this factor are often bound to verbal stimulation, which is probably more restricting than, for instance, pictures.

The three factors may be ordered along the dimension of steering. Most spontaneous is Free personal writing. Here the writer himself or perhaps a friend are the only receivers. In Free narrative writing some demands exist. At least the teacher takes part of the written products. In Bound writing these demands are greater, and expectations about a certain content are added.

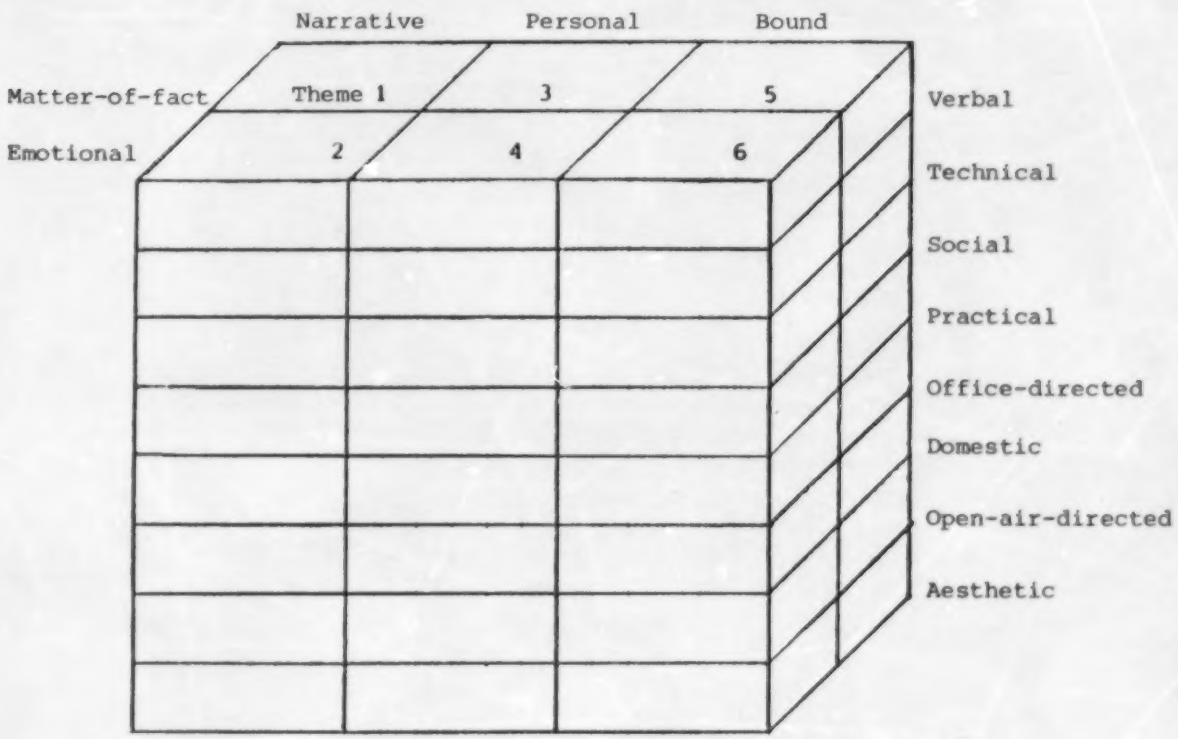
The most popular activities, those with ratings above 3.50, are divided between narrative and personal writing. First comes "Write a story from your own fantasy", then "Read stories written by your friends". Reality gives inspiration, too, and in third place comes "Write about something real you have taken part in". "Write a letter to a friend" also lies over 3.50.

The three factors, narrative, personal and bound writing, have been used in the construction of the following test and for the planning of the design for the experiment "The cat", which is described later on.

Writing at school

In this case the aim was to study the attitudes to different essay themes. To keep the themes within a reasonable number and at the same time to cover a wide area of interests, a model was built with dimensions according to the following figure.

Figure 3. Model of interest areas



The areas of interest in the right margin were taken from a Swedish test constructed by Waern (1960). The model contains 48 themes. These were rated on a five-point scale. Most popular with means over 4 were:

A thrilling ghost story	4.43
How I should like to furnish my own room	4.41
When I won the school competition	4.18
If I was a famous movie star	4.02
What happened when Sweden won a world championship	4.00

Four of these five belong to the emotional dimension. Three of them contain the word "I", i.e. they belong to personal writing. The least popular themes were matter-of-fact-oriented:

What my own word-book would be like	2.72
A visit to a picture exhibition	2.69
From 8 to 5 at the type-writer	2.64

If the interest areas are used as the basis for comparisons we get the following series:

Open-air-directed	3.75
Practical	3.52
Aesthetic	3.38
Social	3.37
Domestic	3.37
Verbal	3.32
Technical	3.31
Office-directed	3.07

A factor analysis gives partly other dimensions than the original model. Five factors were found. The first has been called "Social and manual, narrating from reality". The themes with loadings come from everyday life and are based on personal experience. Girls have higher values on the items within the factor. Boys, on the other hand, have higher ratings on items within the next factor, which has been labeled "Open-air-directed, narrating from reality". Two factors have more fantasy features. Again, one is more dominated by boys' interests, the other by those of girls. They have been named "Technical, technical fantasy" and "Verbal and aesthetic, verbal fantasy". A last and fifth factor was sex-bound to a lesser degree. It has been labeled "Matter-of-fact, describing".

The experiment "The cat"

In the inquiries we found some activities and themes more popular than others. As a consequence we investigated whether these preferred items also gave the best production in free writing.

The first of our three experiments had the over-all title "The cat". Six conditions were tested according to the following overview.

Table 33. Conditions in "The cat"-experiment

	Matter-of-fact stimulation	Emotional stimulation
Free narrative writing	Pictures of food and appearance	Pictures of nice cat and of hunting cat
Bound writing	Words about food and appearance	Positive and negative adjectives
Free personal writing	Text, instructions for a diary about looking after a cat	Text, answer to an advertisement about experiments with cats

Pupils from the 191 group were randomly distributed over the conditions. The randomization was controlled with the aid of 24 variables from our language measures. Only one of these gave a p-value lower than .10 according to variance analyses.

In the assessment of the experiments we had no possibilities to make complete language analyses. Instead we had to use measures which could be quantified by the computer alone. In the choice of such variables we could, of course, use the evaluations from the essays "At the museum" and "At the camping ground". The variables available were grouped according to the following list:

Measures of productivity and variation, e.g. number of words, different words and words used once.

Measures of word length, including number of long words, i.e. words with more than six letters.

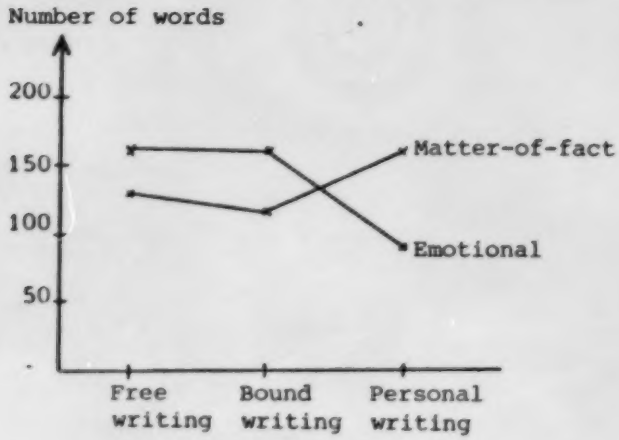
Measures of sentence length and punctuation, e.g. punctuation marks and words per sentence.

Differentiating words, see table 28 (p. 43).

Estimated ratings, built on results from multiple correlations.

For the productivity variables the results show an interaction, here illustrated by the number of running words.

Figure 4. Number of words in the six conditions



In the first four cases we find a clear difference between emotional and matter-of-fact stimulation but not between free and bound writing. The two topics within personal writing show an opposite result. Speaking in terms of variance analysis we have an interaction. We have interpreted this such that the emotional stimulation might be too strong. In the introduction "advertisement" experiments with cats was mentioned but no hint of painful experiments was made. They could just as well have involved tasting delicious cat food. But the words "animal experiments" have a negative meaning for many Swedish children. An ordinary day shared with a cat is a safer theme.

The experiment "The children's book"

The design and the themes of this experiment have already been presented in table 27 (p. 42). The essays at that time were used in a comparison between child and adult language. Here we have to look at differences between the themes. The pupil groups were the same as in the previous experiment, i.e. randomized.

As productivity is the most important linguistic variable, we give the following table with the number of words.

Table 34. Means for running and different words

Theme	Running words	Different words
The wonderful rescue	292	146
Run away plans	265	137
A day at the Zoo	265	134
An evening at the amusement park	265	134
An exciting competition	258	132
An imaginary friend	208	109

The estimated creativity judgement also gave highest value to the theme "The wonderful rescue". "An imaginary friend" was, according to the teachers, the most difficult theme for the pupils. That theme gave the least productivity but also proportionally more negative traits like auxiliary verbs, banal words and negatives.

Several of the themes were designed to be of a kind favouring imagination. Petterson, however, makes the interesting remark that children take the opportunity of writing about their own experiences. This was especially the case with the themes about the Zoo and the amusement park (Swedish "Tivoli"). Our Malmö children took the chance to write about their visits to the Zoo and Tivoli in Copenhagen.

The experiment "Near and far"

We used the same 2 x 3 design as in the experiment "The cat". The pupils were randomized into different groups. One of the experimental factors was named "instruction", the other "theme". An instruction aimed at creativity runs:

"Try to write in an exciting way. Think of many different things to tell about. Use your imagination and write as interestingly as possible. Try to be ingenious and write about unusual and unexpected events."

The other instruction concentrated on correctness and read:

"Write in a legible hand. Try to spell the words correctly. Use your wordlist or ask your teacher if you can't spell. Put the punctuation marks in the right places and begin a new sentence with a capital letter."

Three themes were given with varying degrees of nearness to the children's own reality:

"Near": How I saved the situation when our house was totally covered with snow.

"Between": How I saved the situation when we ran ashore on an uninhabited island.

"Far": How I saved the situation when we made an emergency landing on a foreign planet.

The results may be considered a disappointment: no differences were found. This, on the other hand, is enlightening: the kind of writing is not affected by a short introduction for these children. No differences in the results could be traced to the differences between the two instructions. Between themes the most conspicious differences occur in word length. The theme about a foreign planet had the longest words, that about an uninhabited island the shortest. The latter result may be explained simply by the fact that "uninhabited island" in Swedish is expressed in two short words, one of three letters, the other of only one: "öde ö". Thus we find, again, that a theme dealing with unrealistic fantasy is no better than a theme which treats more everydaylike conditions.

MAIN RESULTS OF THE FRIS PROJECT

We may summarize with the following points.

1. A significant linguistic development has taken place between grades 4 and 6 in the Swedish school. This development is valid above all for productivity, while small or no differences are found for language usage.
2. When expert ratings are taken as criteria, prediction from language facts rests above all on measures of productivity.
3. Ratings can be predicted by a few simple facts from the essays. These are: the number of different words, of unusual words, of punctuation marks and word length. The pedagogical consequence is that word knowledge is far more important than syntactic competence.
4. It is possible to describe the children's language by the aid of factor analysis. The dominating factors have been interpreted as different styles of productivity.
5. Sex differences exist and tend to increase during the intermediate stage. Girls have higher productivity than boys but no differences can be found for linguistic usage.
6. Differences between social groups exist in grade 4 but almost disappear in grade 6.
7. Comparisons between adult and child language confirm the findings from age development and rating prediction: vocabulary is important.
8. In choosing between essay themes, children prefer those with "I" or "we" in the title.
9. Realistic and everyday topics give as good productivity as themes of a more fantasy-loaded kind.

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